2. Jean Itard 1950 *Pierre Fermat.* Bâle (Verlag Birkhäuser).
3. Jean Itard 1948 "Fermat précurseur du calcul différentiel" *Internationales d'Histoire des Sciences*, no. 4, 589-610.

SCIENTIFIC INSTRUMENTS OF THE SEVENTEENTH AND EIGHTEENTH CENTURIES. By Maurice Daumas. Translated and edited by Mary Holbrook. New York (Praeger), 1972. 361 pp., plates, bibliography. US $38.50.

Reviewed by Stillman Drake
University of Toronto

This book, originally published in French about twenty years ago, is said by the publishers to have pioneered a significant change in the writing of scientific history, and to have been edited and brought up to date by the translator. The second claim is at best superficially true; it is to be hoped that the first is not true at all.

The one page devoted to seventeenth-century air pumps betrays the French origin of the work. "Guericke's pumps are too well known for it to be necessary to describe them here," says the author. Those of Hooke and Boyle are likewise omitted, though a brief description of Papin's is given. The English version might well have added something here, even at the expense of deleting some of the generalizations in Part II concerning social factors.

Original sources appear to have been sparsely used with regard to the earliest instruments. As evidence for a sector made at Paris in 1610-15, a book is cited bearing the date 1564. This misprint on the title page of a Rouen edition of 1654 or 1664 is allowed to convert it into the "first edition" of a book by Henrion, who was born about 1580, and whose instrument is dated 1616 on the next page. The bibliography omits original works up to 1630 about the sector by Hulsius, Gunter, Faulhaber, Galgemaier, Oddi, and Coignet, as well as the special studies of Antonio Favaro. On the rival proportional compass, a paper by P.L. Rose in 1968 has been added for this translation; but though Fabricio Mordente is named in its title, his instrument (which was assiduously promoted by Giordano Bruno) is neglected.

Even less satisfactory is the early history of the telescope, despite many excellent monographs on the subject. The same may be said of the microscope and barometer. Despite Stelluti's accurate printed studies of the bee and other insects in 1630, this book states that "the first microscopes were of very little practical value." Delay of microscopical science until the 1660's is then laid at the door of the instruments, rather than their users. As to the barometer, the reviewer is baffled by the

statement that "...mercury was not used as much in the early stages as later on...."

Doubtless there is much information in this large and beautifully printed volume that is not to be found elsewhere. The utility of a general reference work resides, however, as much in the avoidance of error as in the bulk of material. Judging from sections dealing with topics most studied by the reviewer at first hand, it is for the latter and not the former that this book can be commended.

INVISIBLE COLLEGES. DIFFUSION OF KNOWLEDGE IN SCIENTIFIC COMMUNITIES. By Diana Crane. University of Chicago Press, 1972. 223 p. US $9.

Reviewed by William R. Scott
University of Utah

This book studies the sociology of research in science, and, to a lesser extent, in technology and the humanities. In addition to a fairly extensive review of the literature in this area, the author presents data and conclusions from a questionnaire sent to persons doing research in two areas: finite group theory and rural sociology. The principal conclusion is that in any such restricted area of research there (usually) is a world-wide "invisible college" which is responsible for the direction that research in the area will take, performs recruiting activities, etc. Moreover, the existence of this college is responsible for the characteristic shape of the graphs of cumulative publications in a field vs. time, for example. The book also contains a number of other tables and charts which indicate various sorts of relationships among the authors involved, citations, etc. The reviewer will confine his remarks to the book's treatment of finite group theory.

The list of research people in the theory of finite groups was compiled by including authors of journal articles listed in the bibliography of D. Gorenstein's *Finite Groups* (Harper and Row, 1968) and authors in a list extracted from the 1948-68 issues of *Mathematical Reviews*. A total sample of 305 research papers and 102 authors appeared. Conservatively, the number of research papers is too low overall by a factor of ten, and at least by a factor of six in the 1948-68 period. Most likely, the list of 1948-68 research papers used should be relabelled "important papers in the theory of finite groups." It is the reviewer's belief that this very great reduction in the number of papers considered by the author would not have much effect on the conclusions reached in the study.